REMARKS

The Action does not acknowledge the amendment filed November 15, 2004. Please confirm that the amendment has been entered.

The specification has been amended to improve its form and to correct typographic errors. Approval and entry are requested.

Submitted herewith are Replacement Drawing Sheets 1, 2, 4 and 5, FIGS. 1, 2, 3B, and 4 with reference numerals. Sheet 3, FIG. 3A with reference numerals was filed with the amendment of November 15, 2004. Entry of the Replacement Sheets is requested.

Several allowed dependent claims have been rewritten in independent form as indicated in the following table:

Allowable Dependent Claims	Rewritten Independent Claims
6	39
7	40
20	43
21	44
23	45
25	46
26	47

Dependent claims 6 and 7 depended from claim 5 which in turn depended from claim 4, dependent on claim 1. However, the subject matter of claims 6 and 7 did not incorporate or rely on the pulse frequency limitations of either claims 4 or 5. Accordingly, independent claims 39 and 40 include the limitations of claim 1 but not those of claims 4 and 5.

Allowed claims 30, 31, and 38 have been amended to improve their form.

Submitted herewith is a Declaration of Fred Grow, inventor of the application. Mr. Grow compares the operation of the circuit of Mizutani 5,189,398 with the operation of the circuit of

the application. The Declaration demonstrates that in the Mizutani circuit, conduction of the UV tube is not quenched by action of the RC circuit 3. Rather, conduction is quenched by a parallel connected, pulsed power supply. RC circuit 3 shapes the sensor output (a) signal 51 to (b) signal 52 at the input of flame recognition circuit 4, Mizutani, column 3, lines. 25-28, FIGS. 1 and 5.

Applicant's flame detector and fuel valve control utilize an ultraviolet (UV) sensor which is subject to failures by indicating the presence of UV radiation in total darkness, a runaway condition, or in response to wave lengths of light other than the UV radiation of a burner flame, a condition sometimes described as "shifted spectral response" or SSR. The disclosed control checks for both runaway and SSR conditions without a mechanical shutter as used in Graves 3,541,549 or Egi et al. 4,835,525. This is accomplished with a quench circuit and a band pass frequency discriminator which differentiates a selected or desired intermediate pulse frequency from a lower pulse frequency (an SSR condition) or a higher pulse frequency (a runaway tube condition).

A UV tube with a series connected quench circuit, together with a non-pulsed DC supply, generates a desired pulse signal in the presence of a burner flame and undesired pulse signals if the tube is contaminated or in the absence of a burner flame. A discriminator circuit distinguishes between a desired flame responsive pulse signal and an undesired pulse signal to generate an output signal that controls the fuel valve for the burner.

Other features of the control include a fail-safe lockout circuit and the ability to locate the DC power supply remote from the quench circuit and the UV tube which is adjacent the flame. The lockout circuit, which is independent of the discriminator output circuit in controlling the

fuel valve, is responsive to an abnormal condition of the flame detector circuit to close the fuel valve.

It is preferable that the UV tube be located adjacent a flame for maximum sensitivity and reliability. However, it is sometimes desirable that the other circuit components be located remotely, so that they are not subjected to the high temperature of the burner. By virtue of the series connection of the quench circuit capacitor, together with a non-pulsed DC power supply, a relatively large quench circuit capacitor can be used; and both the LED coupling circuit and power supply can be located at a distance from the UV tube and burner without the stray capacitance of the connecting circuitry affecting the circuit operation, see specification page 12.

Applicant traverses the rejection of claims 1, 28, 29, and 32 as anticipated by Mizutani 5,189,398. Independent claims 1, 28, and 32 have been amended to call for a non-pulsed DC supply. This together with the series connected quench circuit in the cathode/anode circuit of the UV tube generates a desired pulse signal in the presence of a burner flame and undesired pulse signals if the UV tube is contaminated or in the absence of a burner flame. Claim 29 depends from claim 28 and adds a load element in the cathode/anode circuit. These claims are not anticipated by Mizutani which has a pulsed DC supply and in which the CR circuit 3 does not provide quench operation as explained in the Grow Declaration.

Applicants traverse the rejection of claims 2 and 3 as obvious from Graves 3,541,549 and Mizutani. Claims 2 and 3 depend from claim 1 and add an output circuit which opens a burner fuel valve control in response to the desired pulse signal and closes the fuel valve in response to an undesired pulse signal. The deficiencies of Mizutani are pointed out above. The missing

elements are not found in Graves where the UV tube is powered from an AC source, not a DC supply, and a shutter mechanism is required.

Applicant traverses the rejection of claim 5 as obvious from Mizutani and Egi 4,835,525. Claim 5 depends from claim 1 and specifies that the desired pulse signal has a selected intermediate frequency while undesired pulse signals have a high frequency if the UV tube is contaminated and low frequency in the absence of a flame. The discriminator circuit passes the intermediate frequency pulse signal and rejects high or low frequency pulse signals. Neither Mizutani nor Egi describe a UV tube which if contaminated generates undesired pulse signals at a high frequency and undesired signals at a low frequency in the absence of a flame. The flame recognition circuit 4 of Mizutani does not separate desired intermediate frequency signals from high frequency and low frequency signals. Rather, it generates an output signal for any frequency above a selected level.

Egi does not have a UV tube, but rather describes a photosensor, column 2, line 35. A photo sensor is not subject to contamination or to the runaway condition of a UV tube, producing pulses in the absence of a flame. It would not be obvious to combine the two disclosures to provide the circuit defined in claim 5.

Lockout claim 9 has been rewritten as claim 41, and claims 10-17 depend directly or indirectly from claim 41. Claim 42, dependent from claim 41, has been added to the failsafe lockout circuit. Applicant traverses the rejection of the lockout claims as obvious from Graves in view of Mizutani. Claim 41, as redrafted, emphasizes the independence of the lockout circuit from the fuel valve control which is shown in Graves. There is nothing in either Graves or

Mizutani which shows a lockout circuit responsive to an abnormal condition of the flame detector circuit to close the fuel valve. More particularly, each of claims 10-16 identifies a specific abnormal circuit condition to which the lockout circuit is responsive. Claim 17 specifies that the lockout circuit includes a time delay which prevents closing the fuel valve with the temporary loss of flame responsive signal. Claim 42 describes the lockout circuit as comprising an SCR responsive to the abnormal condition of the flame detector circuit which SCR conducts and actuates a relay to close the fuel valve. Further details of these circuits are found in the specification at page 15, line 3-page 17, last line. None of the circuits of claims 10-17 and 42 is suggested by Mizutani or Graves.

Applicant traverses the rejection of claim 35 as obvious from Mizutani. Claim 35 depends from claim 32 and specifies that the series connected quench circuit includes a capacitor, that the UV tube is located adjacent the flame, and the DC power supply and an LED coupling circuit are remote therefrom. The purpose of this arrangement in removing the coupling circuit and DC power supply from the high temperature of the burner flame is discussed above and in the specification at page 12. The claim defines much more than a matter of choice. The remote location is not possible unless the quench circuit is series connected with the UV tube and the quenching action is not provided by the power supply.

Reconsideration and allowance of the application as now presented are requested.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with sufficient postage as First Class Mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, on January 25, 2006.

Lydia Liepinaitis
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AMENDMENTS TO THE DRAWINGS

Submitted herewith are Replacement Sheets 1, 2, 4, and 5 with reference numerals.